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PROJECT DESCRIPTION:
STUDY OF ISSUES RELATED TO
VOLUME AND INTENSITY OF PHYSICIAN SERVICES

Task #1

Cooperative Agreement

No. 99-C-99169/5-01

May 5, 1988

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I. OBJECTIVES OF THE PROJECT

The objectives of this project are as follows:

A. Analyze methods of affecting the volume and intensity of physician services:

   1. Identify alternative explanations of how physician decisions affect volume and intensity
   2. Describe a range of existing controls and analyze anticipated effects on costs, quality, efficiency, equity and transaction costs
   3. Identify criteria for valuing the effectiveness of volume/intensity controls and conduct a normative, comparative analysis of the various controls
   4. Identify potential "new" controls and analyze anticipated effects on costs, quality, and access

B. Describe existing controls used by both "public" and private carriers:

   1. Perform a telephone survey to elicit information from private insurance carriers and all Medicare carriers on utilization and perceived effectiveness of controls that have been implemented

C. Determine optimal methods of demonstrating effectiveness:

   1. Discuss the theoretical underpinnings
   2. Describe and critique actual methods presently used to demonstrate effectiveness; prepare a standard "template" or "protocol" for evaluating
   3. Undertake case studies of controls alleged to be particularly

effective, in order to examine and illustrate the evaluative methods used

D. Discuss the impact of a Resource-Based Relative Value Scale (RBRVS) on the provision of physician services

   1. Analyze the potential impact of RBRVS on volume/intensity under various hypotheses about physician behavior

II. BACKGROUND

A. Reasons for Concern About Volume and Intensity Effects on the Level and Direction of Expenditures

Concern about the volume and intensity of services supplied by physicians has been stimulated primarily by the growth in spending on Medicare's Part B, which, by 1985, had become the nation's third largest domestic spending program (Juba, 1987). With the exception of the years of the Economic Stabilization Program (1971-1974), Medicare spending on physician services has increased at least 10% per year since the inception of the program. Recent increases have been even more dramatic, however: between 1978 and 1983, the average annual rate of increase was 20.5% (Burney, et al., 1984). Approximately half of this rapid escalation in expenditures can be attributed to increases in the price of physician services (primarily because of inflation in the general economy, but also as a result of physician fee inflation in excess of general inflation), and a tenth of it is due to an increase in the number of Medicare beneficiaries. But over two-fifths of the recent growth in spending on physician services is presumed to result from increasing utilization of services on a per capita basis; thus, cost containment within the Medicare program appears to depend upon controlling the volume and intensity of physician services provided to beneficiaries.

The implementation of the Prospective Payment System within Medicare's Part A has probably exacerbated the concern over physician services. At least some of the savings achieved through the PPS has resulted from a shift in care from the hospital to the outpatient setting (Fisher, 1988). Given PPS incentives to restrain inpatient volume and intensity, and the incentives of the fee-for-

service reimbursement presently in effect in Part B, physicians are likely to substitute outpatient care for inpatient care (and thus avoid constraints on practice or limitations of hospital-provided inputs) whenever possible.

While the rapid rise in Medicare expenditures has been the primary impetus for concern about physician services, issues of quality and appropriateness of care are also involved. Recent demonstrations of wide variations in physician practice patterns (Wennberg and Gittelsohn, 1982; McPherson, et al., 1982; Connell, et al., 1984; Roos and Roos, 1981; and Chassin, et al., 1987) suggest a lack of consensus on the "appropriate" care for at least some medical conditions. Although relationships between the intensity of care and the outcomes of care have not, for the most part, been established, demonstrations of physicians' modifications of their own practice patterns when presented with information about variations (Wennberg, 1977; Dyck et al., 1977) suggest that there is some amount of flexibility in what physicians themselves consider appropriate practice.

A third reason for concern about the volume and intensity of physician services is that Medicare's current reimbursement mechanism provides varying incentives for providing different services in different sites. Invasive services are generally thought to be overpriced in relation to evaluative and management services, for instance; four- to five-fold differences in payment per unit time for inpatient surgery and office visits, after adjustment for complexity, have been documented (OTA, 1986). Physicians thus face financial incentives to substitute invasive for evaluative and management services whenever possible. To the extent that such substitution occurs inappropriately, the quality of care is adversely affected and costs may be affected.

Incentives to provide the same services in one site rather than another also exist within the Medicare program. In 1982, for instance, average prevailing charges for inpatient visits were 11 to 32% higher than for office visits (OTA, 1986.) Differentials in payment levels for new as opposed to old procedures have also been noted. Additionally, substantial regional differences in Medicare payments for the same services are common; a review of 1975 charge data showed three-fold variations in cost-of-living adjusted fees that could not be explained by quality or malpractice expense differences (OTA, 1986). The appropriateness of differentials in payments between urban and rural physicians has also been questioned. These incentives, and the resulting discrepancies in volume, intensity, physician income, and beneficiary copayments, raise concerns about equity (both for beneficiaries and providers) within this federally funded program.

Finally, the significant increase in volume and intensity of physician services and the resulting impact on cost forces higher premiums. The 1988 increase of 37% in Part B premiums is a case in point; not only does this increase in premiums reduce what Medicare beneficiaries can spend on other things, but it is also possible that at least some were unwilling to continue subsequent coverage.

B. Factors Affecting Volume and Intensity

A number of factors are thought to influence the volume and intensity of services provided by physicians; these include the financial incentives presented to the physician by the payment mechanism, the physician's value system, the characteristics and desires of the patient, the characteristics of the broader system within which care is delivered and administrative or

financial controls implemented explicitly to restrain volume and/or intensity. The relative influence of each of these (or other) factors on physician behavior is not known, but consideration of their qualitative effects, and empirical study of their quantitative effects, is important in attempts to control the volume and intensity of services.

Much of the cost-containment activity of recent years has been based on the premise that payment of physicians on a fee-for-service basis at current levels is more inflationary than capitation, in that it offers stronger financial incentives to provide a greater number of (or more expensive) services. This hypothesis, in turn, is based on the assumption that physicians respond, at least somewhat, to financial incentives. Such a behavioral response may take the form of an increased number of services provided, substitution of more profitable services for less profitable ones, provision of services at sites where reimbursement is greater, "bundling or unbundling" of services to maximize reimbursement, or restriction of patients' access to services with negative profits (Eisenberg, et al., 1987).

Empirical evidence concerning physicians' ability and willingness to "create demand" for more services or for certain services is not strong. During the national Economic Stabilization Program, in which payments were frozen, Medicare services increased (Gabel and Rice, 1985; Yett, et al., 1983; Eisenberg, et al., 1987), while the volume of private services per physician fell (Yett, et al., 1983). At least some of the Medicare increase was attributed to "unbundling" of services, however (Eisenberg, et al., 1987). When Medicare payment rates were decreased in Colorado, increases in medical, surgical and laboratory services were observed (Rice and McCall, 1982; Eisenberg et al., 1987). Some evidence exists that more lucrative services may

be substituted for other services when relative payments change (Marquis, 1982; Rice and McCall, 1982; Danzon, et al., 1984; Danzon, et al., 1980; Danzon, et al. 1983; Eisenberg, et al., 1987).

On the other hand, direct tests of demand creation on the quantity of services at a given price have often (though not always) found effects that are small (Wilensky and Rossiter, 1983; Pauly, 1980), or explainable by changes in quality or declines in non- monetary prices. Relatively few studies, and no definitive study, have shown that changes in the price or availability of physician services cause changes over time in volume and intensity. Phelps (1986) has recently expressed skepticism about the ability of empirical data ever to determine whether "true" demand creation occurs.

What is perhaps equally important, the demand-creation hypothesis is not consistent with the expectation, evident in the rationale for the RBRVS, that lower prices for invasive services will cause decreases in the volume of those services. That is, it is unclear whether services made more lucrative by a change in relative prices would always be provided in greater amounts, especially if those services are concentrated in and form a substantial part of the income of particular specialties. A scenario can be imagined in which physicians who typically provide the newly profitable services will find their incomes increasing if they simply maintain previous levels of provision, while physicians who provide the now less lucrative services would need to increase volume in an attempt to maintain their previous income; a change in relative prices might thereby stimulate provision of the services whose profitability has been reduced and dampen provision of the services whose relative prices were increased.

The financial consequence of a practice decision is not the only factor influencing that decision, however. Physicians have as their primary goal the improvement of patients' health (Eisenberg, et al., 1987) and are legally and ethically bound to "do no harm". Thus, their response to financial incentives is constrained by these other concerns. The extent to which physicians do respond to financial considerations is likely to depend largely on their beliefs about the patterns of care that represent high-quality (or even adequate) care: if a range of practice patterns are considered equally appropriate in a particular instance, physicians may be able to respond to financial incentives by providing the most profitable, rather than the least profitable, services while still providing appropriate care. If appropriate options are more limited, the physician may be less willing to respond to financial incentives. The values that individual physicians place on providing high quality care versus the value placed on maximizing or maintaining income will influence their behavior in this regard.

Certain characteristics of the patient will also influence the services provided by the physician. Patients may be unwilling to accept services without limit, and a demand-inducing physician may suffer a loss in reputation (Pauly, 1980; Dranove, 1984). A model of the determinants of utilization of ambulatory care developed by Anderson and Newman (1973) identifies three relevant types of variables: predisposing (e.g., socioeconomic and attitudinal factors that encourage the use of ambulatory services); enabling (e.g., income, insurance status, supply of physicians); and health status (e.g., indicators of the existence or severity of perceived or diagnosed conditions) (Buczko, 1986). In a number of studies, health status indicators were found to be the most important determinants of utilization, suggesting that patients' signs,

symptoms and apparent severity of illness influence physicians' choices to a significant degree.

Finally, certain characteristics of the system in which care is delivered may affect the volume and intensity of services. Defensive medicine attributable to the threat of malpractice liability, for instance, is thought to stimulate the use of diagnostic tests and procedures. Quality assurance and utilization review activities may encourage or discourage the use of certain services. And the kind of technology to which the physician has access will influence his or her provision of services.

III. ANALYSIS OF METHODS FOR CONTROLLING VOLUME AND INTENSITY: CONCEPTUAL

A. Methods of Analysis and Criteria for Valuation

We will approach the question of analyzing existing and new controls on volume and intensity in two steps. We first provide a positive analysis intended to lay out the expected effects of each type of control, depending on the set of assumptions about physician and patient behavior, and about the nature of the market environment. In the next step we use a prespecified set of normative criteria to comment on the desirability of the expected effects of each control.

1. Positive Analysis

The first step in this analysis is to generate a list of possible volume-affecting devices. Table 1 provides a preliminary list of the types of controls we will examine. We have classified these devices into three broad types, depending on the main channel by which physician behavior is affected. One set of controls falls broadly into a set intended to affect the "price" or

"revenue" incentives that physicians face. A second set affects volume by imposing a set of requirements on the physician to justify the necessity of care to the patient (who may have to pay more); these controls might be said to result in a higher "transaction cost" for the physician. The third set uses direct administrative controls to limit volume.

We will then examine three broad types of hypotheses about physician behavior, under two alternative sets of assumptions about the environment. The behavioral hypotheses, described in more detail below, are:

1) Net income (profit) maximization, where physician time is included as a cost;
2) Behavioral models in which physicians are motivated entirely by non-financial incentives; and
3) Target income theories, which blend concern for income with behavioral response to other influences.

The first two hypotheses describe the end points of a spectrum of motivation -- from no response to financial incentives to exclusive motivation by such incentives. The third hypothesis is intended to describe an intermediate case in which both types of incentives are present. Each volume-affecting device will then be considered under each of these three behavioral hypotheses (see Figure 1).

TABLE 1: PRELIMINARY LISTING OF DEVICES USED TO CONTROL VOLUME AND INTENSITY

Price Incentives to Physicians

- Customary, Prevailing, and Reasonable Reimbursement
- Fee Schedules
- Physician Diagnosis Related Groups
- Capitation
- Expenditure Caps

Non-Price Controls

- Assignment Policy
- Copayment
- Preferred Provider Organizations
- Second Surgical Opinion Programs

Administrative Controls

- Coding
- Utilization Management:
    - preadmission/preservice approval
    - concurrent review
    - case management
    - retrospective review

FIGURE 1

Device Model	Competitive Environment	Assignment Policy	Price Incentives	"Transaction Cost" Limits	Administrative Limits
"Profit" Maximization	Yes	Mandatory			
		Optional			
	No	Mandatory			
		Optional			
Behavioral	Yes	Mandatory			
		Optional			
	No	Mandatory			
		Optional			
Target Income	Yes	Mandatory			
		Optional			
	No	Mandatory			
		Optional			

There are, in principle, twelve possible "cells" for each device. It is likely that, in exposition, some of these cells will be consolidated. However, this scheme should serve as a useful organizing device.

In each "cell" we will be interested in two kinds of conclusions. One set of conclusions is positive: what is the expected effect on resource utilization and expenditures, quality, efficiency, equity and costs, and what is the feasibility of the control (see Figure 2). The second set of conclusions is normative (see the section on "Normative Analysis," below), and will assess the desirability of those expected effects.

FIGURE 2

Criteria Model/ device	Resource Utilization	Expenditure	Quality	Efficiency	Provider equity	Patient equity	Trans. Costs	Feasi-bility
Profit max with no competition under CPR								

Resource utilization will be measured by actual physical inputs, and expenditures will be determined by multiplying the price of these inputs by the numbers used. The impact of each control device on quality of care will be evaluated in terms of access, appropriateness of treatment and impact on health status. The efficiency of each device will also be assessed. This criterion will compare the ability of each device to attain a level of quality for a given expenditure. Other relevant policy goals are provider equity, which compares the extent to which different devices establish fair and equitable compensation across physician specialties, location of services provided and type of services provided. The financial burden on enrollees and their ability to obtain adequate care is an important component of the policy's goals which will be incorporated in the column entitled patient equity. Devices will also be compared in terms of the "social transaction costs" they impose. Social transaction costs refer to the costs to patients, physicians and the administrative agency of providing and receiving care. For instance, some control devices may require re-negotiating physician-patient relationships, which imposes transaction costs on the physician. Quality and billing control devices may require the physician to invest extra time in paper work, a transaction cost that may affect willingness to participate in

[illegible]

[illegible]	[illegible]	[illegible]

[illegible]

[illegible]

[illegible]

the program. Thus, evaluation of the impact of any control device must consider the physician's reaction to these three dimensions and their interaction. These costs will increase as the reliance on non-price controls increases and they should be taken into account when the efficiency and desirability of a device are evaluated. Last, the likelihood that a device could be introduced and implemented should be considered as a function of the political feasibility that the proposed device will be accepted by all involved groups and will receive legislative approval.

2. Normative Analysis

The next step of the analysis entails the valuation of the predicted responses to each control device/model combination. In this stage of the study, the predicted responses will be compared against a pre-determined set of criteria representing the normative goals the policy aims to achieve. We anticipate looking at five primary criteria:

1) Is volume closer to the optimum?
2) Is quality closer to the optimum?
3) Are resource costs closer to the minimum, given volume and quality?
4) Is equity among patients and providers improved?
5) Is the scheme nearer to feasibility?

The comparative valuation of the model/control device combination will determine which device may best achieve the desired policy goals.

Clearly it is unrealistic to expect that one device would be superior to all other devices on all dimensions and will emerge as the clearly preferred choice. Consequently, the criteria will have to be weighted to reflect their relative importance. We will develop a weighting scheme and analyze the

sensitivity of our recommendations to changes in the weights assigned to different criteria.

B. Models of Physician Behavior

While full elaboration of a variety of models of physician behavior will be one of the tasks of the project, we can sketch out the main features of each set of concepts, and illustrate the questions to be pursued further.

1. "Profit maximization" models of physician behavior

As a benchmark for considering other conceptual frameworks for predicting how physicians determine the volume of their services, we first describe two models of "profit maximization." The quotation marks are intended to reflect the idea that profit will be defined as revenues net of both explicit costs (e.g., payments to aides) and the implicit subjective opportunity cost of the physician's time spent serving Medicare patients. One model ignores possible competitive interactions between physicians, while the other model considers those interactions more explicitly.

The net revenue received from Medicare patients, including payments made for patients for whom assignment was accepted as well as payments received from patients themselves in the form of copayments, collections of charges in excess of Medicare reimbursements, and patient payment of bills for which claims have been submitted, represents the receipts of the physician's "business". Costs are of two types. Some costs are explicit, representing payments for inputs bought in markets (examples include payments to labor, for supplies, or for malpractice premiums). However, the work time the physician supplies directly also represents an input, but one that is not bought in any

market. The relevant measure of the cost of the time sacrificed in this way is the value to the physician of the next best use of that time. A reasonable measure is the revenue net of explicit costs that could have been received if the physician had spent the time caring for non-Medicare patients; both the price received from those patients and the time it takes to attract and serve them would be relevant. We call this the non-Medicare marginal net revenue (NMMNR). The value to the physician of foregone leisure (what he or she would require in order to give up leisure) would be an alternative measure. One empirical difficulty is that the value of sacrificed leisure and the value of NMMNR are probably not constant over Medicare volume, but rather probably increase, at least with the total volume of physician work time.

If we can assume that the price received from Medicare is fixed, then the physician's maximization problem is a simple one: he or she only need determine the volume of services to Medicare patients at which the price received from Medicare equals the marginal cost of the care (including both objective and subjective input costs). If the quantity of services demanded by Medicare patients equals or exceeds the quantity physicians are willing to supply, the quantity observed becomes the quantity they are willing to supply. If the quantity of services demanded is less than what physicians are willing to supply, the quantity observed is (in this benchmark story) the quantity demanded. The possibility that physicians themselves can affect the quantity patients will demand will be discussed later. Here, variation in intensity may enter.

In this portion of the project we will explore the implications of this model for the determination of volume. Of special interest will be the possibility that patients may be more willing to accept a bundle of services

which is less desirable to them (perhaps because of greater time cost), but more profitable to their physician, when the reluctance of physicians to serve them increases. (Put differently, volume increases may be the way patients and physicians "conspire" together to get more physician revenue from Medicare when initial levels of Medicare payments are set too low to induce the physician to render services, or to accept assignment.) The multitude of ways in which net revenues per unit received by the physician can be determined will be examined.

We then extend this framework to consider the possibility that physicians can affect patient demand by the content of the advice they offer patients. The possibility of additional volume effects, once demand creation has been set at the profit maximizing level, will be discussed.

The second broad class of models focuses more directly on the impact of alternative physician opportunities on each physician's actions. On one hand, as Luft and others have noted (Luft, et al., 1987), with a fixed price received by the physician, a fixed price paid by the patient, and quality or amenity variation possible, the effect of greater competition will be to lead to higher levels of such quality or amenity. On the other hand, as Dranove (1983) has shown, the availability of other physicians as a choice for patients who suspect their physician of generating demand may serve to limit that strategy. But as Pauly and Satterthwaite (1981) have argued, a large number of sellers may also make it more difficult for a patient to detect demand creation.

The main objective here is to apply these different ideas to alternative controls intended to affect volume, and to show the possible impacts of such controls. Special attention will be given to the determination of whether a

given volume control device may be more effective, or more appropriate, in some circumstances rather than in others.

2. Behavioral Models

While much of the economics literature emphasizes physicians' responsiveness to change in the price paid for their services, other models of behavior may rely upon non-economic influences.

a. The Patient's Agent. One of the most popular models of physician behavior suggests that they seek to serve as their patient's agents. A substantial portion of the physician's satisfaction with practice is fulfilled by serving successfully as the patient's advocate. In this role, the physician makes decisions that represent the patient's best interest -- at least what the physician perceives to be the patient's best interest. Thus, the physician as the patient's agent makes decisions that he or she believes the patient would make if the patient had as much information as the physician.

We suggest that there are several components to this model of medical decision-making. First, the physician's primary role as healer demands that he or she attempt to optimize the patient's clinical outcomes. Second, the physician will also want to serve as the patient's economic agent, trying to make decisions about the use of medical services with their financial impact on the patient in mind. Third, doctors will be influenced by their patients' health preferences, which are manifest through patient demand for medical care. Finally, patient convenience and other preferences of the patient will influence the decision of physicians who are attempting to act in their patients' best interest. This model is described in chapter 3 of Eisenberg's book, Doctors' Decisions and the Cost of Medical Care (pp. 57-77). Pauly has

described a merger of the philosophies of physician-as-perfect-agent and physician-as-income-seeker, describing physicians as "partially benevolent oligopolists" (Doctors and their Workshops). Eisenberg has described the same merging of goals as "an effort to satisfy simultaneously a number of goals, some of which are conflicting...in a multiattribute utility function" (Doctors' Decisions and the Cost of Medical Care).

b. The Economic Agent. Some evidence suggests that physicians are sensitive to the financial impact of medical care on their patients, even though this effect may be smaller than those concerned with cost containment would desire. (On the other hand, many of those concerned with cost containment are more often interested in payments by third party payers, and less often in the patient's own financial exposure). Despite their generally poor knowledge of medical care prices, patients' insurance coverage and patients' financial status, physicians do seem to respond to the cost of care to their patients. Some evidence suggests that the elasticity of demand for medical care may be influenced more by physicians' decisions on behalf of patients than by patients' own decisions (e.g., patient- versus physician-initiated visits, use of laboratory tests, hospitalization).

c. The Clinical Agent. Physicians' concern for their patients' health has been shown to be a major determinant of their utilization patterns. Physicians' principal professional motivation is to apply their scientific knowledge, their problem-solving ability and their ability to gather and analyze evidence to improve or maintain the health of individuals who have turned to them for help. The unifying hypothesis is that physicians gain personal utility from their patients' benefit.

Clinicians writing about differences in physician utilization, such as Wennberg, assume that doctors want to give better care if that is possible. However, there is substantial uncertainty involved in medical decision making, and the strategy that would optimize patient health is not always clear. This uncertainty may arise because data do not exist or because the available data cannot be processed effectively. It is also possible that data are available but not known to the individual physician making the decision. The reasons for this deficiency in the physicians' knowledge base are many, but the psychic and financial costs of acquiring new information are important factors influencing the availability of data to reduce uncertainty.

Given this uncertainty in medical practice, it is not surprising that physicians seeking to provide optimal care are influenced by forces outside the doctor-patient interaction. In addition to the influences of peers and professional leadership, commercial sources also exert substantial influences.

d. Patient Preferences and Demand. Patients' demand for medical services is a manifestation of several factors, including price, convenience, perceived value and alternative sources of relief. As the patient's agent, the physician must be able to consider these factors in choosing the appropriate clinical strategy. Perhaps most difficult is understanding the patient's preferences for various health states. Since patients may find it difficult to articulate their preferences and physicians may find it difficult to discuss their patients' values, decisions which a physician believes represent what the patient would want may be misguided. If a physician attempts to serve as the patient's agent but does not understand the patient's preferences, it is possible that those preferences will be misrepresented.

e. Patient Convenience. The convenience of the patient may influence utilization patterns. For example, patients may prefer to have laboratory tests drawn by their own physician rather than going elsewhere for venipuncture. However, economic factors inevitably interact with the desire for convenience. Patients who travel farther for laboratory testing are likely to incur larger travel costs and are likely to have greater opportunity costs in doing so.

f. Physician Characteristics. In addition to serving as the patient's agent, a physician may also be motivated by his or her own preferences and role in the medical profession. Dr. Eisenberg has explored the powerful influence of professional leadership and its profound implications for peer review and educational influences (Eisenberg, 1986). Physicians will also be influenced by their desires for particular styles of practice, their own personal characteristics, and the practice setting. The physician's desire to serve the social good is another non-economic behavioral goal that needs to be considered in predicting or understanding physicians' responses to changes in the medical care system, particularly those designed to influence their behavior.

3. Target Income

One school of economic thought asserts that physicians are able to artificially expand demand for their services. According to this view, physicians who would like to earn additional income will induce demand in some fashion. The physician might influence patients to desire more care by implying that more services are needed for better health. More frequent follow-up visits, more tests, more hospitalizations and even more potentially dangerous services such as drug therapy and surgery will increase the

utilization of medical care and, therefore, physician income (assuming that the physician's income is positively related to the number and/or complexity of services provided). These services are not necessarily useless. In fact, they may be of substantial value to the patient. However, it is also possible that services of negligible or even zero clinical value will be accepted by the patient if the physician recommends them. It is also possible that the new demand is not new at all, but rather a desire for medical care that was always there but never revealed because there were insufficient providers, or insufficient financial reward to the provider-supplier, to allow it to be exhibited.

Why, then, would physicians ever stop inducing demand? At some point, physicians will be sufficiently satisfied by their income that they will no longer induce demand. They may have a particular "target income" that will satisfy their perceived needs. This theory of the target income suggests that physicians will stop inducing demand for their services when their own financial needs are met. However, the establishment of a target is not so simple, if it does exist.

A more sophisticated version of the theory postulates that physicians increase their income until the cost of obtaining additional income is equal to the value they place on that income. This occurs when the disutility of new income (e.g., guilt or working time traded off against leisure time) exceeds the utility of the new income. Since the marginal utility of increased income probably declines with increasing income, and since the psychic cost of acquiring additional income probably increases with increasing income, there will be a point at which physicians will no longer seek additional income. This point determines their target income. However, if

the marginal value of money changes or the marginal psychic cost of increasing income changes, the target income will also change.

C. Identification of New Controls

The objective of this portion of the project is not only to evaluate existing controls, but also to develop some new ideas on methods for controlling volume and intensity. While those methods obviously cannot be fully described yet, we anticipate looking carefully at the possibility of two-period models, in which payments or benefits (or both) in this time period affect next time period's financial flows. One model is that of the West German system in which physician payments are reduced next period if this period's growth exceeds some target. Another model might be the Swiss system, in which patients who use low amounts of service in this period are rewarded with lower premiums in the next period. It might be possible to combine these two concepts, and to examine the effects of alternative standards of current-period performance and alternative methods of next-period adjustment.

IV. ACTUAL METHODS OF CONTROLLING VOLUME AND INTENSITY

The purpose of this section is to describe the range of approaches currently used by a sample of private insurance carriers and by all Medicare Part B carriers to control volume and intensity. A limited attempt will also be made to assess the affect of private volume/intensity controls on the cost of health insurance premiums.

A. Survey of Private Insurance Carriers

We will conduct a telephone survey of approximately 125 private insurance carriers who are members of the Health Insurance Association of America

(HIAA). HIAA researchers will contact insurance executives responsible for the company's conventional business, PPO plans, and HMOs. The researchers will ask questions related to the methods for controlling volume and intensity of physician services in each line of business.

The survey questions will be appended to HIAA's "Managed Care Survey," which is annually administered to member companies. The response rate from this survey is expected to be 90 percent. Although the survey includes some questions related to volume and intensity controls, a special set of questions will be developed for this project. These questions will explore the company's use of three types of controls: price incentives for physicians, non-price controls, and administrative controls. Thus, controls analyzed empirically in the survey will be the same as those chosen for theoretical analysis in Task III.

A preliminary set of questions for HIAA members is attached in Appendix A. These questions were developed by the University of Minnesota and are currently under review by researchers at HIAA and the University of Pennsylvania. Each company will be asked, for each line of business, how it pays for physician services under a majority of its contracts. This question is followed by others that ask about the use of specific types of controls. Changes in the payment system may be particularly important. Consequently, we will ask if the company has tried any of the following: changing the coding of physician services, "bundling" physician services, and preventing multiple billings for the same service.

If any controls are used, we are interested in how they are evaluated by the company. The answers to these open-ended questions will indicate the level of sophistication that companies have developed in this area. Also, we

will ask companies that do not use the controls whether the stated reason had to do with perceived ineffectiveness, cost of administering the control, or perceptions of opposition from physicians, patients, or employers.

Finally, we will ask the companies that use controls whether the controls have increased, decreased, or have had no effect on volume and intensity. Our preliminary set of volume and intensity indicators consists of: physician outpatient visits, physician inpatient visits, tests (x-rays, etc.), procedures requiring anesthesia, and total cost of physicians' services. Carriers will be asked whether each control has increased, decreased, or has had no effect on each indicator of volume and intensity.

While these questions will measure the perceived effectiveness of controls, it is not clear whether they measure actual success in controlling expenditures on physicians' services. A limited attempt will be made to measure actual success. HIAA will estimate reduced-form equations with data from a national sample of 1,500 employers. Premium costs will be regressed on the following variables: employer and employee characteristics, employee cost-sharing, plan enrollment and benefits, local and state market variables, and utilization review. The dependent variable can also be expressed as increases in premium costs from the previous year.

B. Survey of Medicare Carriers

Information on use and perceived effectiveness of volume/intensity controls will also be collected by a telephone survey of all Medicare Part B carriers. This survey will be conducted by the University of Minnesota, under the direction of Professor Feldman. We anticipate that the survey instrument used for the private insurance carriers can be used, with modifications, to

survey the Medicare carriers. Therefore, the project description in Section A, above, also applies to the Medicare survey. (An exception is the reduced-form premium analysis, which will not be performed on Medicare data.)

In order to design the survey, Profesor Feldman will make one trip to Baltimore within one month after the project is awarded. The purpose of this trip will be to meet with HCFA staff in order to get advice on the proposed survey instrument. Methods for conducting the survey will also be discussed and agreed on before the survey is administered.

V. TECHNIQUES AND CRITERIA FOR EVALUATION OF THE EFFECTIVENESS OF CONTROLS

A. Theoretical Basis for Analyzing the Effectiveness of Controls

The purpose of this section is to describe what constitutes adequate methods for evaluating volume control measures, and to use this framework to review evidence offered for current private and public sector devices. This work will draw on the evaluation literature (Campbell & Stanley, 1962), but will be geared to a more intuitive and useful presentation of valid ways for determining program effectiveness. The objective will be to develop practical ideas by which to judge effectiveness.

The private sector offers a wide array of volume management devices, all claimed to be effective. While there has been no comprehensive evaluation of the type we propose in this project, many benefits managers for employers who have used these devices feel that they have not all turned out to be as effective as claimed. Development of valid methods to determine effectiveness is thus of critical importance to both the current private sector and prospective public sector users.

Our discussion here will point to two types of problems. On one hand, overblown claims of effectiveness for volume management techniques raise false expectations, and lead to eventual waste and disappointment. On the other hand, informal methods of evaluation (did our costs fall?) may cause truly effective devices to be overlooked, or to be treated as narrowly applicable when in fact results can easily be generalized. Finally, one needs to have some estimate of the "confidence" in any measure of effectiveness, that is, a measure of the probability that the device works. Absolute certainly, black-and-white results, are unachievable goals--but our analysis will indicate how to estimate the confidence of results.

Evaluating new interventions in physician payment or regulation is in principle a simple matter. One wishes to determine if the intervention made a difference and, if so, how large that difference was. While it will usually be possible to observe the situation after intervention, the critical question is counter-factual: had no intervention occurred, what would have been the state of affairs? The problem, of course, is that if "other things" in addition to the intervention are also affecting outcomes, it may become exceedingly difficult to separate the effects of those things.

Two methods of evaluation presently used for private sector controls have difficulties in this regard. The most frequent strategy is the simple before and after comparison. The most obvious difficulty is that movements in outcomes may reflect trends which are already there. For instance, in the period 1984-1986 when hospital days were falling, virtually any hospital volume control method appeared to be effective.

Another strategy sometimes used is to estimate the counterfactual effect from a program effect. Some case management programs, for example, rely on

the case manager's estimate of what the costs for each patient would have been without the program.

In contrast, the use of a comparison group guards against exaggeration of program effects. The strongest design is to compare the changes in trends in the site with intervention to changes (if any) in trends for a comparison group. If no group is available, estimation of the strength of changes in various inputs would be useful. If one knows, for example, the effect of changes in demographics, one could then adjust any observed time trend in effects with information on the expected impact of changes in the age distribution.

The objective of this part of the project will be to present a practical technique for judging the effectiveness of a program (as "proven," "likely," "possible," or "unknown,") and to illustrate the ideas with examples from the literature.

B. Description and Critique of Actual Evaluation Methods

In addition to reviewing studies of the effectiveness of volume controls (of which we expect there to be few), we intend to elucidate the evaluation methods used by those in the private sector who have claimed significant effectiveness. We will do this partially in our survey of the literature and in the second portion of the case studies described above. In this part of the case studies, we will perform an "evaluation of the evaluation", an analysis of the appropriateness of the methods used to claim effectiveness. As noted above, in addition to controls identified as being particularly effective through the surveys, we will also select for study certain controls cited in the literature. Efforts said to be effective will be identified

through publications such as Business and Health, insurance companies, and utilization management firms.

In all case studies the relevant person(s) within the organization will be interviewed by telephone. They will be questioned about the criteria and methods used to assess controls, the time periods over which effectiveness was evaluated, and the sources of data used. The evaluation of approximately five control devices will be described in this way, and then critiqued; by illustrating the problems encountered in actual assessments, the intent of this portion of the study will be to illustrate how such evaluations might be improved and what the "ideal" methods might be. The final product of the case studies will be both a detailed discussion of the methods themselves and an analysis of the methods which were (or could be) used, to quantify their impact.

VI. EFFECTS OF RESOURCE-BASED RELATIVE VALUE SCALE ON VOLUME/INTENSITY

A. Analytic Approach

Our analysis of the impact of a resource-based relative value (RBRVS) on the volume and intensity will be based in large part on elaborations of theories we have suggested elsewhere. One approach is described in a recent article in JAMA (Eisenberg, et al., 1987); there we hypothesize that the effect of a price change on volume depends on (a) whether the price change applies to a large or small set of services and (b) whether the total net income of the physician is increased or decreased by the price change.

The other theory hypothesizes that demand depends on how patients respond to attempts by physicians to alter the mix of services: if the alternatives succeed in increasing total payments from Medicare to the physicians for the

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APPENDIX A

DRAFT SURVEY FOR PHYSICIAN VOLUME AND INTENSITY
April 20, 1988

1. What method is used by a majority of your (ASK ONE: Fee-for-service, HMO, PPO) contracts to pay for physicians' services? (check one)

a. usual, customary, or reasonable charge (UCR) ____
b. capitation payment ____
c. relative value scale (RVS) ____
d. fee schedule other than RVS ____
e. other: ________________________ ____

If RVS is used, describe how it is calculated (e.g., on the basis of charges): ____
____

2. In order to control the number and cost of physicians' services, some health plans are using managed care approaches. Are you presently using any of the following? (check all that apply)

a. mandatory surgical second opinion program? ____

If yes, what has been the effect of second opinions on:

total number of physician outpatient visits?	INCREASE	DECREASE	NO CHANGE
total number of physician inpatient visits?	INCR	DECR	NO CHG
total number of tests (X-rays, etc)?	INCR	DECR	NO CHG
total number of procedures requiring anesthesia?	INCR	DECR	NO CHG
total cost of physicians' services?	INCR	DECR	NO CHG

b. preservice approval other than surgical second opinion? ____

If yes, what has been the effect of preservice approval on:

total number of physician outpatient visits?	INCREASE	DECREASE	NO CHANGE
total number of physician inpatient visits?	INCR	DECR	NO CHG
total number of tests (X-rays, etc)?	INCR	DECR	NO CHG
total number of procedures requiring anesthesia?	INCR	DECR	NO CHG
total cost of physicians' services?	INCR	DECR	NO CHG

c. concurrent review of patient care? ____

If yes, what has been the effect of concurrent review on:

total number of physician outpatient visits?	INCREASE	DECREASE	NO CHANGE
total number of physician inpatient visits?	INCR	DECR	NO CHG
total number of tests (X-rays, etc)?	INCR	DECR	NO CHG
total number of procedures requiring anesthesia?	INCR	DECR	NO CHG
total cost of physicians' services?	INCR	DECR	NO CHG

d. concurrent case management? ____

If yes, what has been the effect of concurrent case management on:

total number of physician outpatient visits?	INCREASE	DECREASE	NO CHANGE
total number of physician inpatient visits?	INCR	DECR	NO CHG
total number of tests (X-rays, etc)?	INCR	DECR	NO CHG
total number of procedures requiring anesthesia?	INCR	DECR	NO CHG
total cost of physicians' services?	INCR	DECR	NO CHG

e. retrospective review of patient care? ____

If yes, what has been the effect of retrospective review on:

total number of physician outpatient visits?	INCREASE	DECREASE	NO CHANGE
total number of physician inpatient visits?	INCR	DECR	NO CHG
total number of tests (X-rays, etc)?	INCR	DECR	NO CHG
total number of procedures requiring anesthesia?	INCR	DECR	NO CHG
total cost of physicians' services?	INCR	DECR	NO CHG

f. physician profiling and feedback? ____

If yes, what has been the effect of profiling and feedback on:

total number of physician outpatient visits?	INCREASE	DECREASE	NO CHANGE
total number of physician inpatient visits?	INCR	DECR	NO CHG
total number of tests (X-rays, etc)?	INCR	DECR	NO CHG
total number of procedures requiring anesthesia?	INCR	DECR	NO CHG
total cost of physicians' services?	INCR	DECR	NO CHG

4. If you currently use any of these managed care approaches, how do you evaluate them to determine whether they are effective?

____

____

____

5. If you do not currently use managed care approaches, can you rate the importance of the following reasons for your decision? (1=very important, 2=somewhat important, 3=of little importance, 4=not at all important)

perception that managed care would not reduce number or cost of physician services Rating: ____

perception that managed care program would be too costly and/or difficult to administer ____

perception that physicians would resist managed care ____

perception that consumers would resist managed care ____

perception that employers would resist managed care ____

6. Some health plans are using payment system changes to control the number and cost of physicians' services. Have you tried any of the following? (check all that apply)

   a. changing the coding of physician services? ____

   If yes, what has been the effect of coding changes on:

total number of physician outpatient visits?	INCREASE	DECREASE	NO CHANGE
total number of physician inpatient visits?	INCR	DECR	NO CHG
total number of tests (X-rays, etc)?	INCR	DECR	NO CHG
total number of procedures requiring anesthesia?	INCR	DECR	NO CHG
total cost of physicians' services?	INCR	DECR	NO CHG

   b. "bundling" physician services into broader categories than visits or procedures (e.g., a single payment per episode of illness)? ____

   If yes, what has been the effect of "bundling" on:

total number of physician outpatient visits?	INCREASE	DECREASE	NO CHANGE
total number of physician inpatient visits?	INCR	DECR	NO CHG
total number of tests (X-rays, etc)?	INCR	DECR	NO CHG
total number of procedures requiring anesthesia?	INCR	DECR	NO CHG
total cost of physicians' services?	INCR	DECR	NO CHG

   c. preventing multiple physicians from billing for the same service (e.g., eliminating payments for assistant surgeon)? ____

   If yes, what has been the effect of preventing multiple billings on:

total number of physician outpatient visits?	INCREASE	DECREASE	NO CHANGE
total number of physician inpatient visits?	INCR	DECR	NO CHG
total number of tests (X-rays, etc)?	INCR	DECR	NO CHG
total number of procedures requiring anesthesia?	INCR	DECR	NO CHG
total cost of physicians' services?	INCR	DECR	NO CHG

7. If you have tried payment system changes, how did you evaluate them to determine whether they were effective?

   ____

   ____

   ____

8. If you have not tried payment system changes, can you rate the importance of the following reasons for your decision? (1=very important,

2-somewhat important, 3-of little importance, 4-not at all important)

perception that payment system changes would not reduce number or cost of physician services Rating: ____

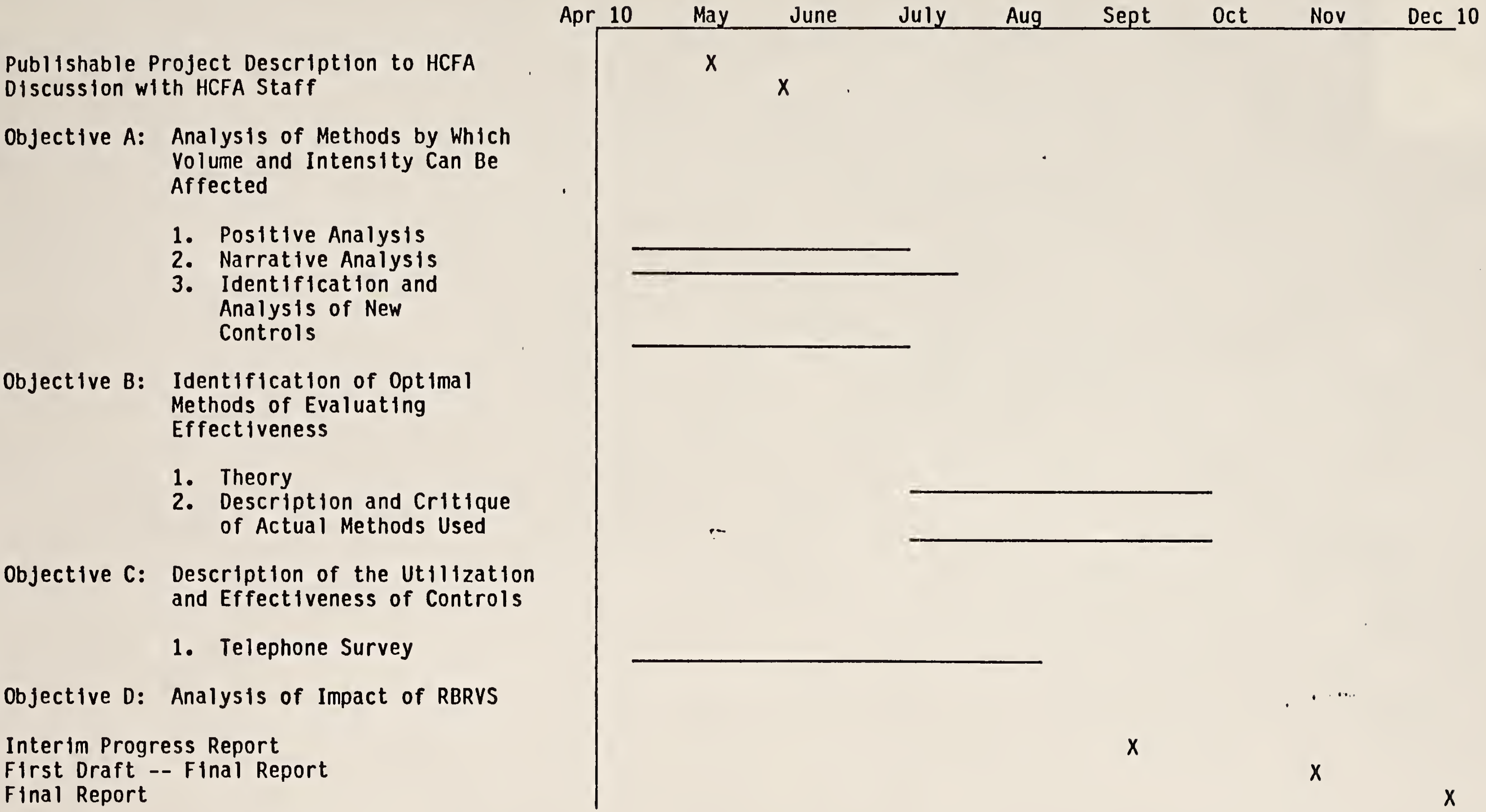
perception that payment system changes would be too costly and/or difficult to administer ____

perception that physicians would resist payment system changes ____

perception that consumers would resist payment system changes ____

perception that employers would resist payment system changes ____

Appendix B: Timeline: Study of Issues Related to the Volume and Intensity of Physician Services



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